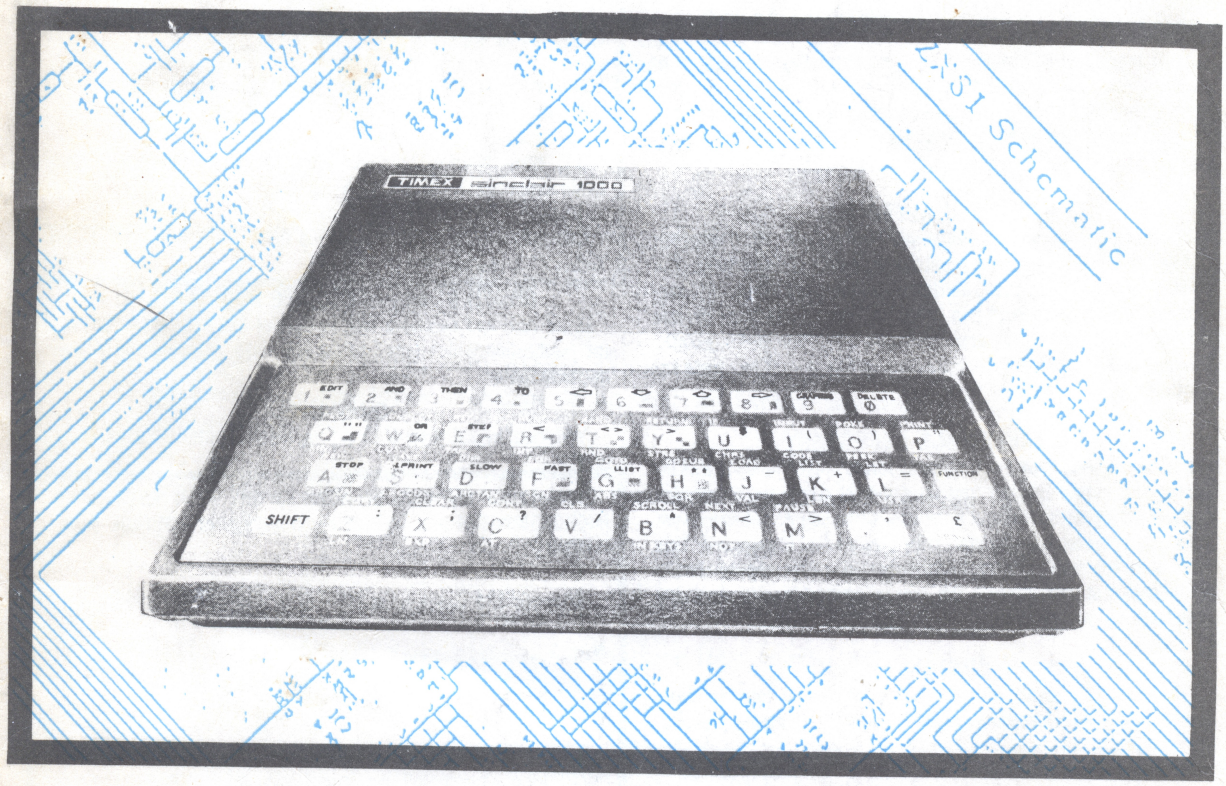
PREMIER ISSUE

T·S Horizons

Affordable Quality for the Timex Computer User

NOVEMBER NO. 1 $1.25



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REVIEWS

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See page 24 for details.

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The computer industry is filled with success stories in which people have soared to great profits in a short period of time. The book's author, Ed Simpson, started his computerized mail list service and was reaping profits in 3 short months. This book reveals the secrets he and others used to obtain fast, high profit growth. You can apply these same techniques and watch your business expand.

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You do not need to be a computer expert to make money in this industy. The author himself had no previous computer knowledge before starting his successful business. Often you do not even need to own a computer and can start with a very small investment! This book does not stop with the descriptions of microcomputer based businesses but also reveals the marketing techinques so vitally necessary for you to succeed.

CONTENTS

This book is packed with detailed examples of how to make money with a microcomputer related business. Contains practical knowledge.

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- •Mail list services
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- •Newsletter publishing
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T-S Horizons

Affordable Quality for the Timex Computer User
2002 SUMMIT ST. PORTSMOUTH, OHIO 45662

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T-S Horizons

Affordable Quality for the Timex Computer User

2002 SUMMIT ST. PORTSMOUTH, OHIO 45662

Dear Reader,

Welcome to the first issue of T-S Horizons. How ever you came to hold this magazine in your hands, we present it to you with pride. We are committed to bringing you usable and interesting information about your computer - the TS-1000/ZK81 - at an affordable price. We hope you will stay with us. We have many big projects in the works, and I think you will find that T-S Horizons will benefit you more than any other magazine for the Sinclair computer.

First of all, I would like to thank the folks who have placed ads in this issue. As you might suspect, advertising in a new, unproved magazine is at best a risky proposition. These ads are mostly from small companies, many just starting out in a very competitive field. It takes a lot of faith to write a check and mail it to some mysterious publisher in a little town in Southern Ohio - faith in the idea behind T-S Horizons and faith in the market they are trying to reach.

Now I believe introductions are in order:

Maybe some of you have heard of Tracy Norris. Tracy hails from Louisiana. He is the official Technical Advisor for T-S Horizons, and he tells me he's in for the duration. Tracy is the president of the Gulf Coast Sinclair User's Group. He is the owner of Norris Radio & Electronics. He authored two mammoth technical manuals for the ZX81 and the TS1000. I could go on but Tracy's modesty would be offended. (Besides he'd rather tell you himself.)

Let me just say without Tracy there might not be a T-S Horizons, and we welcome him aboard.

Ken Lewis has agreed to write a continuing series of articles on numberical analysis and other technical applications for the TS/ZX computers. Ken is a nuclear engineer and he holds three or four degrees. If you know any other Timex users who are interested in this subject please give them the word. This series promises to be very useful.

Bill Johnson is a professional architect in Cincinnati. He has written several programs on the ZX81, some of which may be printed here in the future. He has written a budget program for 64K and a program to calculate the solar heat gain of an existing or planned structure. One of Bill's main interests is "user-friendliness" in computer programming.

Another Bill Johnson (who goes by C.W. Johnson here) has written an article for this issue. Bill has designed an uninterruptible power supply for the Sinclair, which is right up his alley, since he is an electrical power coordinator for a large industrial plant. Expect to also see some software from Bill in the future.

Finally we come to the last Bill for T-S Horizons. (I wish!) Bill Moreland is the owner of Magic Castle Video in Columbus, Ohio. Magic Castle is a fascinating little store. If you're ever in Columbus, stop by. In the back part of the store, Bill sells about every videotape you can imagine. But the front half is devoted exclusively to Timex-Sinclair-related products. He has three ZX81's with keyboards set up all the time where you can try out almost any of the software you've ever seen advertised for the Sinclair. Bill has reviewed about 90% of the book/hard/software available (which is of course, a tremendous amount) and his store carries only the cream of the crop. Special thanks to Bill for his contribution to this and future issues.

Special thanks to Ed Simpson, publisher of Cottage Computing magazine for helping to get us off the ground. Also to my nephew Jason, special consultant for "Kids Page." Also to Dad and Mom and Jeff and Debbie and Randy for their encouragement and advice. (Boy this is dragging on, isn't it?) Especially, I want to thank my partner in this endeavor, Carolyn Duncan. Thanks, babycakes.

Stay with us gang. We need you. With a monthly schedule we need all the help we can get. We encourage our readers to submit articles for publication. We want to be very accessible to you. Please fill out this issue's reader survey. And don't miss our special Christmas gift to you in our December issue.

Sincerely,

Rick Duncan, Publisher

MORELAND'S MEMO

COMPUTER INDUSTRY UNSETTLED

Bill Moreland

Computers for the home are the hottest retail electronics being sold these days. The industry is in an explosive phase, with hundreds of new products being introduced on a monthly basis. Things are moving so fast that the computer makers themselves cannot keep track of the market place. And therein lies a story.

Every company that announced a new home computer at the Summer Consumer Electronics Show is late in delivering their products. You might think the tardy deliveries are caused by the huge consumer demand (parts shortages, production problems, or distribution difficulties). Yet in the face of this overwhelming consumer interest, some of the companies are rumored to be withdrawing from the market altogether. The list of companies with problems is impressive, since it includes some of the the "giants" of the fledgling industry.

Atari has reported hundreds of millions in losses, starting last fall with an announcement that drove the stock markets wild. Mattel is reported to be considering withdrawal from the home electronics market because of its continuing financial losses. Commodore has been rumored to be in a similar situation. Texas Instruments has reported similar problems, yet has undertaken new initiatives in advertising and rebate programs to bolster sales.

Only two companies have apparently escaped the huge financial loses. Coleco and Timex are said to be in better financial shape, but both are late in delivery of new products and seem to be having the same kinds of management difficulties that plague the others.

These financial and management problems are brought about by the computer companies' attempts to gain a competitive edge by increasing their market share. Price wars have cost them millions of dollars both directly (losses on each sale) and indirectly (national advertising isn't cheap). Corporate thinking has been inclined to believe that giving away the razor to sell the razor blades (at a handsome price) is the way to maximize profits. Thus huge deficits now will lead to huge profits later, as buyers buy software for their low-priced toys.

On first thought, all the rebate programs, price cutting, and promotional advertising being used by the industry appears to be to the benefit of the consumer. With basic home computers priced at one-third the level they were just one year ago, it appears that average Joe or Jane Citizen is getting a good deal. Unfortunately, the apparent good deal has turned into a huge headache for many.

For example, people who bought Atari, Texas Instruments, Commodore, or Timex computers last year at this time paid as much as 500% more than they would pay now. We have all seen recent, extremely attractive ads for computers from various discount stores. Buying now seem to be very compelling. Yet several of these low price machines have been discontinued by the manufacturers. And replacement new products will not necessarily be compatible with old programs or peripherals. Substantial investments in libraries of programs to fit a new or old computer could be very risky for the neophyte, since the machine they are using could be obsolete before they get it home. More particularly, in the haste to save money, the consumer may buy programs or hardware from discount sources that do not know what they are selling, with the consequence that the new wiz-bang or thing-a-magig won't work with their computer. Mail order purchases are particularly risky for that reason. The razor blade can be sharp for both the corporate giants and the average customer.

A second problem with the emphasis on discount pricing is the tendency towards buying machines that are inappropriate for the use the consumer has in mind. In striving to make a "good" buy (more megabytes per buck), the consumer may be misled by the promise of easy-to-use, user-friendly programs or operating systems that in fact require a genius to interpret. For example, one of the more common mistakes is the purchase of a cheap computer that is not designed for handling large amounts of data, yet the cost conscious buyer tries to apply the device as a list manager or number cruncher. Even small payrolls or mailing lists can tax the capacity and capability of small home computers.

Saving $50 to $300 on the purchase makes good sense, but only if it means not having to spend hundreds of hours or dollars making the machine do what you want it to do. Some people don't have the time to become programmers, nor do they necessarily want to learn the details of the electronics involved in interfacing the computer to a printer or a disk system or a modem.

All of these problems lead to frustration on the part of the average computer buyer, with many people simply giving up. It would be hard to find out but interesting to know how many computers are gathering dust on closet shelves because of frustration and anger.

Indeed, over the long run it may be the ultimate irony of the present boom in the computer business that the larger the number of computers sold, the less computer literate we as a society become. Let's hope not.

Caveate Emptor.

(Editor's Note: Bill's articles was written shortly before the announcement that Osbourne Computer Corporation had filed for bankruptcy.)

T-S NEWS

ITEM: Hardware and software from an unusual source! The Electronic Supermarket of Lynnfield, Mass. sells a wide assortment of items from speaker components to telephones and about anything you can think of, mostly surplus and closeout items. The most recent quarterly catalog advertised two offers of special interest to TS-1000 users.

- "[A] large quantity of dependable computer keyboards with cases that can be hard-wired to...your Times-Sinclair ZX81." Said to be "from a $5,000 computer, with micro-switches of gold plated cross point types." They say the ZX81 can be mounted inside the case. Construction data included. $27.77 plus postage and handling. Catalog No. D3N0278

- Sinclair software package for $10.00. Cassette #1, a 1K games pack. Cassette #2, Junior Education, 16K, math and spelling. Cassette #5, Junior Education, 1K, math. Cassette #6, Family Quiz, 16K. $2.88 each or $10 for four plus postage and handling. Specify Cassette # when ordering. Catalog No. 3M0214

- Electronic Supermarket, P.O.Box 988, Lynnfield, MA 01940, (617)532-2323. Accept Visa, MC, American Express.

ITEM: Since E. Arthur Brown Company published its "Timex-Sinclair 1983 Directory, early this year, at least two other companies have come out with something similar.

- "The Timex/Sinclair Source Book" is put out by Micro Design Concepts, P.O.Box 280, Carrollton, TX 75006. With over 600 listings, using the book is said to be "almost like shopping in a department store devoted exclusively to the TIMEX/SINCLAIR computer." $6.95 plus $1.25 postage and handling.

- "Timex Computer Family Sourcebook." Over 1000 programs and accessories for the TS 1000. From Atlantic Computer, Box 936, Norfolk, VA 23501. $8.95 plus $1.25 postage and handling.

- I wonder if either of the above books list E. Arthur Brown's directory. Their address is 1702 Oak Knoll Drive, Alexandria, MN 56308. Their 1983 directory sold for $5.00.

ITEM: This may be the most important announcement in this column. If you are one of the thousands of TS1000 owners who are tired and frustrated with tape storage and long for a high quality dependable disk drive for your computer, DO NOT MISS THE DECEMBER ISSUE OF T-S HORIZONS! Tracy Norris, Technical Advisor to T-S Horizons, will be unveiling a new 8-inch disk drive especially designed for use with the TS-1000. The price? Let's just say you will literally be amazed. Tentatively, under $200 for one (includes interface). Under $110 for the second. Don't miss T-S Horizons special Christmas gift to you. In the December issue.

ITEM: Keyboards. At least two companies that had primarily been middlemen for larger companies that sold Timex-related products, have come out with their own keyboards in the last couple of months. They seem to be good, reasonably-priced items, with nice extra features.

- E. Arthur Brown's product is the "MKIV Keyboard." There are forty keys, all labelled like the Sinclair keyboard, plus a space bar. The keyboard has a port to add a numeric keypad which is not available at press time. $89.95. Address is 1702 Oak Knoll Drive, Alexandria, MN 56308.

- The Sinclair Place is featuring their "Compact Keyboard" with enlarged DELETE and FUNCTION keys, two SHIFT keys (also enlarged), a space bar, and a numeric keypad included. We don't know if the keys feature the Sinclair legends or not. $88.80. Sinclair Place, P.O.Box 2288, Redmond, WA 98052.

ITEM: A reader in Pennsylvania would like to form a network of Sinclair Spectrum users. If you have a Spectrum and are interested in communicating with other Spectrum owners nationally, please drop us a line. (Send it, Attn: Spectrum User Group)

ITEM: Here are three magazines for Timex computer users that you may not know about.

- Sync Ware News, P.O.Box 5177, El Monte, CA 91734. Sync Ware concentrates on "Electronic and Other Technical Application of Timex Computers" A few clever program listings (not all that technical) and lots of in-house ads. Doesn't seem to be worth the $15 per year (6 issues) subscription rate (but then I may be prejudiced).

- TS User, P.O.Box 155, Vicksburg, MI 49097. TS User (not to be confused with Timex Sinclair User) is eight pages per month, about half of which is a series of quick hardware, software, and book reviews. The remainder is composed of programs and program tips, hardware hints, editorials and "GOZZIP." GOZZIP has "inside info" on developments at Sinclair, Timex, and other major marketers. Also they have no advertising so they aren't afraid to alert buyers to "crooked, lazy and stupid" dealers or to praise reliable dealers. The writing style is choppy and not very "user friendly", but I would recommend it if you plan to buy a lot of software or hardware. $16.95 for 12 monthly issues.

- Busyness, P.O.Box 421773, San Francisco, CA 94101. "Business/Professional Applications for Timex/Sinclair users." Haven't seen a copy yet, but it might be just what some users are looking for, if the quality is good. $12 for 6 bimonthly issues.

(By the way, in case you didn't know by now, Syntax Quarterly has bitten the dust. Small wonder! $5.00 per issue is just too much. However, Syntax Newsletter seems to still be alive and kicking.)

ITEM: InterComputer has come out with a neat gadget called the Intercontroller. It is a computer-controlled HV bus. Plug the power cord in the wall and the interface into the ZX/TS, enter a few lines of BASIC, and up to four appliances can be plugged in, all under computer-control. Home, office, lab, and scientific applications. InterComputer, Inc., P.O.Box 90, Prudential Center, Boston, MA 02199.

ITEM: As mentioned in the box below the computer language FORTH is now available for the TS-1000 from at least three sources. Gary Smith, of Hawg Wild Software, has created a special forum for XFORTH users, called the XFORTH XCHANGE. Gary seems to be an all out FORTH fan. He is a member of the well-known FORTH Interest Group (F.I.G.) and promotes national FORTH conventions. XFORTH XCHANGE is a newsletter published irregularly that prints comments and suggestions from XFORTH users and alerts users to new articles and books on FORTH-related topics. The price is right. (Free) Write to:
XFORTH XCHANGE, c/o HAWG WILD, P.O.Box 7688, Little Rock, AR 72217.

UNKNOWN TONGUES
ALTERNATIVE COMPUTER LANGUAGES

The first computer language most people learn is BASIC. It's easy for beginners to learn. It's powerful and versatile enough to do just about any programming job that might arise. The BASIC dialect that Clive Sinclair developed and incorporated into the ZX81 is both sophisticated and compact. Also the fact that it is built in as ROM, means that the BASIC language does not take up any of the RAM area. In most other computers, like the Apple, the BASIC is stored on a disk and must be loaded into the RAM, taking up valuable memory space.

BASIC has been the mainstay of personal computers since they came into existence. However, BASIC, whether Sinclair's or someone else's, has some inherent weaknesses, mainly slowness and lack of rigor. It is easy to write a sloppy, disorganized BASIC program.

There are other computer languages and a few are gaining a lot of popularity in the world of computing. While most experts feel that BASIC is here to stay, because of its simplicity and the extent to which it has established itself, it is clear that many users are tiring of BASIC and going on to newer, faster, more sophisticated languages.

So where does that leave you and me - the loyal Timex-Sinclair users, with our 8K Sinclair BASIC ROMS built right in? Does a TS-1000 owner have to go out and buy a big expensive machine to satisfy his lust for language?

We at TS-Horizons were glad to learn that several new companies have developed two of the more popular alternatives to BASIC for Sinclair-based machines.

Here we'd like to present a quick overview of the new products. (Longer more in-depth articles will appear in later issues.)

TREE-FORTH
SoftMagic Corp.
1210 W. High Street
Bryan, Ohio 43506

X-FORTH
Hawg Wild Software
P.O.Box 7668
Little Rock, ARK 72217

ZX-FORTH
Forth Dimension
1451 N. Union Street
Middletown, PA 17057

FORTH was designed to make the best possible use of the computer's memory and speed, two cruicial elements in a personal computing. FORTH is becoming very popular, due primarily to efforts of a small but growing group of computer users, the FORTH Interest Group, or FIG. FORTH is fast, about ten times as fast as BASIC. FORTH is multi-tasking. In other words while BASIC can perform only one operation at a time, FORTH can handle up to 10, or even more in some systems.

FORTH is available for the Apple II, Heath, IBM-PC, PDP-11, and TRS-80. Now it is

available for the Sinclair (XC81, TS-1000, TS-1500) from three sources. All three are based on FORTH-79 which is the current standard developed by FIG.

TREE-FORTH has a chip-based system, that plugs right into your Sinclair PCB, and your computer can be switched from BASIC to FORTH, by an external switch. TREE-FORTH is resident on a chip, so there is no wait for the system to load. Also, since EPROM's, can be reprogrammed the chip can be returned to SoftMagic for revisions, to meet any future standards. TREE-FORTH's introductory price for the chip is $49.95 plus $2.00 postage and handling.

XFORTH is a cassette-based system, and is said to contain a very full FORTH vocabulary. It also can be returned to BASIC, by a simple keyboard command. Gary Smith of Hawg Wild Software promotes XFORTH with XFORTH XCHANGE, a special newsletter for XFORTH users. Hawg Wild is continually revising XFORTH to create new versions. The price is $25.00 and $1.00 shipping and handling.

ZX-FORTH from the FORTH Dimensions is also cassette loaded. Some of its features are: auto-repeat on keys, pixel graphics, customized backups, and full screen editing. It comes with two programs: a breakout game and a simple word processor. $42.95 plus $2.00, Postage and Handling.

Partial PASCAL
Semper Software
1569 Brittany Court
Wheaton, IL 60187

Semper Software has introduced what they call "Partial PASCAL." Educators are really pushing PASCAL, because it is a very structured language, and it is said to encourage organized logical thinking in students. For instance, in a PASCAL program, all variables are defined and dimensional at the beginning. This requires the user to carefully think through his program. Pascal uses "block structioning" in which groups of related statements are organized into blocks. Many educators feel the students should learn PASCAL before being exposed to such sloppy languages as BASIC and FORTRAN.

In PASCAL and some other language, you have "integers", which are all the whole numbers from -32768 to +32768 and take up 16 bits of memory, and you have "real" numbers which take up 32-bits and include fractions. Partial PASCAL leaves out real numbers and all the commands that deal with reals. In integer arithmatic all fractional parts are dropped; thus 7/2 = 3 exactly. By being restricted to integers (and for other reasons), Partial PASCAL is much faster than BASIC. However the lack of fractions, makes it difficult to use in some scientific applications. Of course, integers are adequate for program counters and make Partial PASCAL usable for games and other application.

Partial PASCAL's tape handling system appears very attractive. Data saved on tape can be accessed by other programs, unlike Sinclair BASIC in which data are locked into each program.

It is quite encouraging to see such developments as alternative languages appear for the Sinclair. We will be presenting more information on the subject in the future. In the meantime if anyone hears of a ZX81 with a LISP or a TS-1000 with a LOGO, be sure and let us know.

HELP!

By: Tracy Norris

Hello, I'm glad you could join us this month! This is the premier issue of TS-HORIZONS, probably the best computer magazine on the market for the Timex line of personal computers. TS-Horizon's owner Rick Duncan has asked me, Tracy Norris, to write a few columns each month for the Horizon and I heartily agreed for several reasons. 1) TS-Horizons is staffed by people who put their pants on one leg at a time, just like you and me. 2) Since it is a new publication we all have a chance to put our 2-cents in as far as the kind of magazine it should be. 3) Rick has selected the choice few who know what they are talking about to write regular columns in this magazine. Note: This does not exclude YOU! Obviously, if you have the intelligence to order a subscription to such a fine publication then you have the quality it takes to write for it. Let me tell you a little about myself. My name is Tracy Norris, owner/operator of T-tech Industries, a subsidiary of Norris Radio and Electronics. My firm specializes in only one line of computer, the Timex 1000 & 2000 series of personal computers. I repair, modify and offer advice on the Timex. If your computer falls apart you know where to send it for a repair!!! Enough of the talkity-talk, lets get on with what this article is really about.

This column "HELP!" is for you, the Timex user to get your questions about the Timex answered. All you have to do is send me a question and I will do everything possible to publish it in TS-Horizons along with an answer. If you do not feel like waiting every month for an answer, just send your question with a SASE and I will send a speedy reply back to you. I am sorry to say that I am only an intermediate program so I think it would be best to keep "HELP!" related to hardware questions only. You may think that your question is too small or too large for me to answer. HOGWASH! I don't mind sending an answer one page long or 3000 pages long (in the latter case you supply paper & pencils!). As for your questions being answered in this column, I think it would be best to ask for pertinent information only, due to the limited space available. Here's a good question sent from a regular customer of mine:

Question:

Tracy, I am having major problems trying to SAVE and LOAD on my TS-1000. I am using a CTR-31 tape deck from Radio Shack, a Timex 1016-16K RAM, and the ZX printer. Can you give me a clue as to what might be causing my problems?

Don Hughes, Erie, Colorado

Answer:

Yours is not the first question of this sort that I have come across. There are a few things that must be kept in mind when trying to SAVE and LOAD. A portable tape recorder is a device that is intended for voice or music recording and playback. The unit need not be very precise to accomplish that particular task. But nowadays the small inexpensive tape recorders are being used to SAVE and LOAD computer programs, a highly precise task indeed! Did you know that one bad bit in 16000 being read from tape can destroy a LOAD? That bad bit can be caused by several things, for instance: piece of dirt or smudge on tape caused by touching the tape with the fingers, something magnetic may have been placed near the tape causing a portion of the data to be erased, a wobbly tape head not positioned at the right READ

or WRITE angle on the tape (azimuth adjust out of whack), 60 Hz hum coming from a bad filter circuit in the recorder (need to run unit on batteries), clock noise coming from the ZX printer (need to place 5mfd capacitor across 5 volt line on the edge connector), using inferior tapes, or leaving the MIC and EAR plugged in at the same time when SAVEing or LOADing causing feedback to be recorded on the tape with the data. I hope that of these causes you can find your problem.

T. Norris

BOOK REVIEW

By: Rick Duncan

Best of Sync, Volumn 1
Creative Computing Press
39 E. Hanover Ave.
Morris Plains, NJ 07950
$9.95

Recently I was looking for a good book on the TS-1000/ZX81. I wanted something that was strong on programming skills and featured a lot of program listings. When I came across "The Best of Sync", Volume 1, thinking this was what I'd been looking for, I quickly bought it. After all it was filled with game listings, articles about things like graphics, programming techniques, machine language, and hardware projects. Plus it had about twenty pages of product reviews thrown in for good measure. Here was a chance to buy a whole years worth of Sync magazine for just $9.95. I couldn't go wrong! Right?

Well, maybe half-right. What I didn't realize but should have was that in 1981, the year that Sync began publishing, the magazine was written mostly for users of the ZX80 computer. The more advanced ZX81 was not introduced until October 1981. Thus most of the contents of The Best of Sync, Volume 1, refer to the ZX80 and its applicability is severely limited for ZX81 and TS-1000 users.

Most people who ordered the ZX81 from Sinclair when it first came on the market received a special issue of Sync which contained reprints of articles from the first year specifically applying to the ZX81. Those articles listed below that were featured in that special insert are indicated by an asterisk (*).

One of the best features of The Best of Sync is the games section (Chapter 1). Most were written for the ZX80 but have been converted by the editors to run on either the ZX80 or ZX81. All games are for 1K to 2K. The assortment is nice. It has widgets and herkles, detectives and masterminds, chessmen and taxmen, Tic Tac Toe, hangman, and a wordsearch puzzle generator. However the games are all simplified. For instance, in one game, motorcycles are represented by a black square and a grey square.

The mathematical applications chapter (#2) does have some utility. It tells you how to use your computer to set up bar charts*, factor to prime numbers, score tests, plus some others that are not-so-hot. One is an 18-line program to calculate square roots on the ZX80, which does not have the SQR function (or trig functions, or EXP, or LN, etc.)

The graphics chapter (#3) was a bright spot. It includes tutorials on game-creating, on-screen picture drawing, and high-resolution graphics simulation.

Also of interest is Chapter 4 (Useful Programs). "An Inventory System" * is a very usable program and probably compares with programs sold by software companies. The remaining articles are of limited interest. (Two on music generation using the ZX80 and a radio, and a "Billboard" program).

Chapter 5 on programming techniques is about 75% material that is of no use to ZX81 owners. The concepts behind "Using Key and Token Expression," * "Expression Evaluators", * and "PEEK and POKE," are probably already familiar to most Sinclair users.

Personally, the most disappointing chapter was the sixth one, on program conversions. I have been doing some research on converting BASIC programs written for other computers to Sinclair BASIC. I had hoped to find some useful information in this section. However all of the articles deal with the ZX80 version of BASIC, except one which discusses converting ZX80 programs to run on the ZX81.

Chapter 7, Machine Language, was another sore spot. "An Introduction to Machine Code" was edited to apply to the ZX81, but most of the other articles in the chapter applied solely to the ZX80.

Chapter 8, Hardware Theory and Projects, included several good projects for the ZX80 and MicroAce computers. In most cases applying the instructions to the ZX81 and TS-1000 shouldn't be too difficult.

I am still trying to figure out why Sync included Chapters 9 and 10. Chapter 9 is a compilation of all the product reviews from the first year. I don't think any of these items, except one book are still available. The others apply strictly to ZX80 related products. "Resources," Chapter 10 is another dubious section. At least half of the marketers listed here are no longer in business and the rest are no longer offering the products listed.

If you own a Sinclair ZX80 and you plan to use it quite a bit, then I recommend you buy this book (unless you have the first six issues of SYNC). It may be the last book ever published on the ZX80.

But if you own the ZX81 or TS-1000, I warn you that The Best of SYNC, Volume 1, is not as good a deal as it first appears. Maybe you just ought to wait for The Best of SYNC, Volume 2.

KIDS'

ATTENTION ALL KIDS

T-S Horizons has a special section just for you. KIDS' PAGE! Every month we print a special story showing how you can have more fun with your TS-1000 computer. These stories will be written by Jason Setters who, at 13 years old, is probably the youngest computer writer in the world. And you can send in your letters and stories, too. (Note to parents: Reviews of programs like "Quest for the Holy Grail," will be invaluable in helping you find software you and your family can enjoy.)

Plus KIDS' PAGE will have special programs that you can type in yourself and amaze your fiends and relatives. Even our grown-up readers will like these clever programs. This month we have "The Timex Pumpkin" and a surprise program that you can use on days like Flag Day and the Fourth of July. Don't forget this page is just for you. If any of our readers have any short, clever programs, you can send them to KIDS' PAGE, T-S Horizons, 2002 Summit Street, Portsmouth, Ohio 45662.

Now let's try out these programs.

Patriotic Program

This program is a surprise. Type in all the computer instructions carefully. Then push the RUN key and your computer will draw something that will make you feel like saluting.

```
10 LET A$="                "
20 LET B$="                "
30 LET C$="* * * * * *"
40 FOR I=1 to 7
50 PRINT A$, B$,,,
60 NEXT I
70 PRINT AT 0,0:C$(TO 11)
80 FOR I=1 to 4
90 PRINT C$(2 TO 12),,C$ (TO
   11),,
100 NEXT I
```

Line 10:15 grey squares. (Push SHIFT-GRAPHICS then H)

Line 20:15 square grey on top, white on bottom (Push SHIFT-GRAPHICS then S.)

Line 30: To make inverted stars, push SHIFT-GRAPHICS, then SHIFT-B. Then push SPACE to make black square. Then SHIFT-B again, and so on.

TRICK or TREAT

Here's a real spooky program just in time for Halloween. It was written by Mark Hall, a high school student in Anacortes, Washington. It's kind of long but it's a lot of fun. Now you can have a jack-o-lantern without having to buy a pumpkin.

Maybe Mom or Dad can buy some orange cellophane to put over the TV screen to make it look even more scary.

```
  10  FOR D=5 TO 34
  15  LET X=VAL "30-20*SIN  (D/40*
PI)"
  20  FOR X=X TO 63-X
  25  PLOT X,D
  30  NEXT X
  35  NEXT D
  45  LET D=15
  50  PRINT AT 3,D;"  "
  53  PRINT AT VAL  "4",D;"  "
  55  PRINT AT VAL  "8",VAL "11";"
  ";AT VAL  "8",VAL "18";"  "
```

```
  60  PRINT AT VAL  "12 ,D;"▀ ▀"
  65  PRINT AT D,VAL "13";"▀▀▀▀
"
  70  RAND EXP RND
  80  PRINT AT D,13;"   BOO  "
  82  RAND EXP RND
  85  GOTO VAL "65"
```

Graphics Notes:

50: INVERSE SPACE (2)
53: INVERSE SPACE (2)
55: 2, 1, 2, 1
60: 1, 2
65: 2, 3, 2, 2, 3, 1

TIMEX COMPUTING FOR KIDS

"Quest for the Holy Grail"
$17.95 from Softsync, Inc.

This game is an adventure game for all you kids and grown-ups, but you have to use your wits a little and remember the moves you make. They have to be very careful.

You start out as you land on a small island in your plane. Then you go in any direction you like, as North, East, South, and West, and sometimes Up and Down. There are some things you have to look out for. They are savages, apes, nazi soldiers, quicksand and some other things.

When you enter a subterranean tunnel you have to be careful because you can get killed by savages or by a disease called gangrene. You get that by cutting your arm on a rock of some kind.

In this game you have thing you can pick up like guns, machetes, fishing nets, gold coins and other things. Since you are in the jungle and you can be killed by a savage ape, I suggest you use your gun, but you can use your own judgement. Whenever you get the disease you should find something to heal it, but I'm not going to tell you. You will have to figure it out for yourself.

You will have special commands to use, such as:

GET (object), like a flash-light
USE (object), like you gun.
HELP
LIST, shows the objects you have. You can only carry five at a time.

If you find someone, type in QUERY, but you may get no reply.

To find the Holy Grail you must go in the tunnel and search for something, but I won't tell you what it is. But I forgot to tell you one thing. When you get the Grail you must get back to your plane before the volcano blows up or you will die.

For all the readers of my column, I highly recommend this game for you and your family. In my next article I will write about "The Elusive Mr. Big", which is an adventure game that comes with "Quest for the Holy Grail."

Thank you,

Jason Setters

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Solution of N x N Simulataneous Linear- Equations By: Gauss Elimination

By: K.D. Lewis

Gauss Elimination is one of the oldest, most commonly employed, efficient, and straight forward methods of obtaining the solution of sets of simultaneous linear equations on a digital computer. This method is very easily understood and programmed.

Consider as an example the following set of four equations:

$$a_{11}x_1 + a_{12}x + a_{13}x_3 + a_{14}x_4 = b_1$$

$$a_{21}x_1 + a_{22}x + a_{23}x_3 + a_{24}x_4 = b_2$$

$$a_{31}x_1 + a_{32}x + a_{33}x_3 + a_{34}x_4 = b_3$$

$$a_{41}x_1 + a_{42}x + a_{43}x_3 + a_{44}x_4 = b_4$$

This can be written more succincly using matrix notation as:

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \end{bmatrix}$$

This is often abbreviated as AX=B, where A is called the "matrix of coefficients" and X is called the "solution vector."

The solution vector to this set remains unchanged if "elimentary row operations" are performed on the system, i.e., if

1) any equation is multiplied (or divided) by a constant, or
2) a given equation is replaced by the sum (or difference) of that equation and any other equation in the system.

Gauss elimination is, in a nutshell, a sequential application of elementary row operations. The top row is first divided by a_{11}. Thus

$$\begin{bmatrix} 1 & a'_{12} & a'_{13} & a'_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} b'_1 \\ b_2 \\ b_3 \\ b_4 \end{bmatrix}$$

The prime marks [′] denote elements which have been changed from their original values. The first row is then multiplied by a_{21} and subtracted from the second equation. This yields:

$$\begin{bmatrix} 1 & a'_{12} & a'_{13} & a'_{14} \\ 0 & a'_{22} & a'_{23} & a'_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} b'_1 \\ b'_2 \\ b_3 \\ b_4 \end{bmatrix}$$

The first equation is then multiplied by a_{31} and subtracted from the third, then multiplied by a_{41} and subtracted from the fourth. During these operations, the first row is referred to as the "pivot row" and a_{11} is termed the "pivot element."

Following these operations, the entire first column below a_{11} has now been cleared to zero and the set appears as

$$\begin{bmatrix} 1 & a'_{12} & a'_{13} & a'_{14} \\ 0 & a'_{22} & a'_{23} & a'_{24} \\ 0 & a'_{32} & a'_{33} & a'_{34} \\ 0 & a'_{42} & a'_{43} & a'_{44} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} b'_1 \\ b'_2 \\ b'_3 \\ b'_4 \end{bmatrix}$$

The second row now becomes the pivot row and a'_{22}, the pivot element. The second row is divided by a'_{22}, the multiplied by a'_{32} and subtracted from the third row.

Multiplication of the second row by a'_{42} followed by subtraction of this row from the fourth row then clears the remainder of the elements of the second column which fall below the diagonal.

The process is continued with the next rows, each serving as pivot rows, until the equations are in the form:

$$\begin{bmatrix} 1 & a'_{12} & a'_{13} & a'_{14} \\ 0 & 1 & a'_{23} & a'_{24} \\ 0 & 0 & 1 & a'_{34} \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} b'_1 \\ b'_2 \\ b'_3 \\ b'_4 \end{bmatrix}$$

The bottom equation of the system now yields directly the value of x_4 as:

$$x_4 = b'_4$$

The third equation may be solved for x_3 since x_4 is known.

$$x_3 + a'_{34}x_4 = b'_3$$

$$\text{or } x_3 = b'_3 - a'_{34}x_4$$

Repeated back substitution, moving upward, yields only one new unknown for each equation, and eventually the unknown vector x will be completely determined when the top equation is solved for x_1.

THE PROGRAM

The computer program is a straight forward application of these ideas.

1) First, N, the number of equation is prompted and entered. The program limits N to 10 or less, by the dimension statements in lines 4, 5, and 6. However this can be increased depending on the amount of memory available.
2) Then the matrix A is entered by rows, i.e., a_{11}, a_{12}, ...a IN, than a_{21}, a_{22},...a_{2N}, etc.
3) Finally the column vector B is entered as b_1, b_2,...b_N. From this point, the computer proceeds, and the solution is printed out as N components.

EXAMPLE

The system of equations:

$$3X_1 - X_3 = 4$$

$$-X_1 + 2X_2 + X_3 = -2$$

$$3X_1 + 6X_2 + 3X_3 = 6$$

In matrix form is written:

$$\begin{bmatrix} 3 & 0 & -1 \\ -1 & 2 & 1 \\ 3 & 6 & 3 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix} = \begin{bmatrix} 4 \\ -2 \\ 6 \end{bmatrix}$$

1) In this case N=3.
2) Then the coefficients are entered as 3, 0, -1, -1, 2, 1, 3, 6, and 3.
3) Then the B vector is entered as 4, -2, 6.

The solution is

$$X = \begin{bmatrix} 2 \\ -1 \\ 2 \end{bmatrix}, \text{ or } X_1=2, X_2=-1, X_3 = 2.$$

```
 1  REM GAUSS
 2  REM GAUSS ELIMINATION
 3  REM PROGRAM
 4  DIM A(10,10)
 5  DIM B(10)
 6  DIM X(10)
 7  PRINT "INPUT N"
 8  INPUT N
 9  LET N1=N
10  FOR I=1 TO N
11  FOR J=1 TO N1
12  INPUT A(I,J)
13  NEXT J
14  NEXT I
15  PRINT "ENTER B VECTOR"
16  FOR I=1 TO N
17  INPUT B(I)
18  NEXT I
19  LET K=1
20  LET I=K+1
21  IF (A(K,K) =0) THEN GOTO 35
22  LET A1=A(I,K) /A(K,K)
23  LET B(I) =B(I) -B(K)*A1
24  LET J=K
25  LET A(I,J) =A(I,J)-A(K,J) *A1
26  IF (J>=N)  THEN GOTO 29
27  LET J=J+1
28  GOTO 25
29  IF (I>=N) THEN GOTO 32
30  LET I=I+1
31  GOTO 21
32  IF (K>=(N-1))  THEN GOTO 49
33  LET K=K+1
34  GOTO 20
35  LET M=K+1
36  IF (A(M,K)<>0)  THEN GOTO 40
37  LET M=M+1
38  IF M<=N  THEN GOTO 36
39  GOTO 67
40  LET C1=B(K)
41  LET B(K)=B(M)
42  LET B(M)=C1
43  FOR J=1 TO N
44  LET Z1=A(K,J)
45  LET A(K,J)=A(M,J)
46  LET A(M,J)=Z1
47  NEXT J
48  GOTO 22
49  REM BEGIN BACK SUBSTITUTION
50  LET L=N
51  LET SUM=0
52  IF L<N THEN GOTO 57
53  LET X(L)=(B(L)-SUM)/A(L,L)
54  IF (L<=1) THEN GOTO 62
55  LET L=L-1
56  GOTO 51
57  LET J=L+1
58  LET SUM=SUM+A(L,J)*X(J)
59  IF J>=N THEN GOTO 53
60  LET J=J+1
61  GOTO 58
62  PRINT "ROOTS ARE."
63  FOR L=1 TO N
64  PRINT X(L)
65  NEXT L
66  GOTO 68
67  PRINT "SINGULAR EQUATIONS"
68  STOP
```

CREATING AND SAVING FILES

By: Bill Johnson

One of the best features of the BASIC language that Sinclair designed into the ZX-81 (TS-1000) is its ability to SAVE all of its variables, including arrays, in the normal course of SAVEing the program onto cassette tape and reloading the variables along with the program LOAD. This allows us to transfer a file, in the form of data, along with the program to manipulate or interpret it, to and from tape in a single motion.

In this article, I would like to discuss the best ways to create, manipulate and SAVE/LOAD files on the ZX-81 and to point out the pitfalls as well as the opportunities of using it as a personal information storage system.

The questions of how to structure the file and what type of arrays to use will be considered later in this article. First I would like to outline the actual program steps that are essential to create and maintain a file.

A. Create File Array - having decided on the file size, dimension the array accordingly (i.e: DIM T$ (20,32)).
B. Delete DIMension Statement - since the file has been DIMensioned in step A, a re-dimensioning will never be required. Deleting this redundant statement saves file space.
C. Files - can be inserted/overwritten in the array at any time, even after the program has been SAVEd or LOADed.
D. SAVE program and files using SAVE statement in the course of running the program, with a GOTO statement following it, pointing to the beginning of the program,
i.e.:

```
9050 PRINT "PRESS RECORD ON TAPE PLAYER"
9060 INPUT X$
9070 PAUSE 450
9080 SAVE ""
9090 GOTO 1
```

This enables the program to be self-starting when it is re-loaded from tape, eliminating a need for either a RUN statement, which erases the variables and thus the files, or a GOTO, which is cumbersome.

If a file program is structured this way and the files are set up accordingly, there is:

A. Full access to the files as set up.
B. Minimum memory usage (no redundant variable assignments or DIM statements).
C. Minimal chance of erasing files.

Arrays

As a general rule, the most efficient way to store file information, from both a program and variable standpoint, is by using arrays. Because the file information can be accessed by its location or address in an array, we process or access any piece of file information by referring to its address (i.e. T$ (20,2)). This allows us, for instance, to arrange information in a matrix, with a different type of information in each column, and a set of information in each row. The only alternative to using arrays is using a different variable for each file item. This process is so unwieldy as to be unworkable in all but the most limited cases.

File Format

The first step in deciding how you want to pack information into an array is to identify:

A. What information is important and pertinent?
B. What memory constraints do I have?
C. What display constraints do I have?

For example, in writing a program of my own to file and process budget/expenses data for every transaction in a quarterly period, I determined that, though I would have like to store more information, four items were critical: The Date - (mo/dy) of transaction, Remarks - to indicate the place and item(s), Transaction - CASH, VISA, check #, etc., and

$Entry - the amount spent. I limited each data set to these four in this case primarily because of the constraint imposed by the display. I wanted to be able to list all of the information on one 32-character line, so as to be able to display a set of consecutive entries on the screen in a row/column format. The memory constraint is no problem, since I have 64K but you may have to be careful not to create files that are too large for the memory that you have available. In that case, you may have to trade-off file size against memory size.

To be more specific, the 32-character line of my budget program consists of the date (5 characters), Remarks (14 characters), Transaction (4 characters), $Entry (6 characters) and 3 spaces to separate the items. The act of setting the display format will force you to be specific about the type of information you need to store, and this in turn will give you a clear structure that can be translated into a programming array structure.

Options in Setting-Up Arrays

There are two sets of options to face in choosing an array format, the first of which is between numeric and alphanumeric variables.

1. Numeric/Alphanumeric

   If the files you are storing hold primarily words and symbols, the string (alphanumeric) array is the simplest and best solution. You simply insert the file information into the array location (i.e. LET R$ (20) = "KROGER-MEAT"). But if the file consists of words and numeric values (or entirely numeric values) there are schemes available:

   A. You may use multiple arrays, storing words and numbers in alphanumeric and numeric arrays, respectively. This allows for the easiest, most straight forward manipulation of variables within the program. Each display line would be two or more separate array items printed sequentially.

      Thus a statement like
      PRINT D$(20);" "; R$(20); " "; T$(20);" "; E(20) would yield a line like this:

      10/25 KROGER-MEAT 5.26

      Unfortunately the time consumed in searching for and printing all the items can become too great.

   B. Or you can store all the data for one entry in a single alphanumberic string. This has several ramifications. If the numberical data is to be recalled and manipulated, then the function VAL must be applied to the substring after it is sliced (i.e., LET x=VAL T$ (20.5) (10 TO 14), would return the numberical value). Then to be reinserted, STR$ must be used (i.e., LET T$ (20,5) (10 TO 14) = STR$ x or something similar. The cumbersome nature of storing numeric values is compensated by the speed with which they can be displayed (a line can be printed with a simple command), and the clarity of having the variables stored in the same format as they are displayed. And if variable-length items need to be right-justified, then better to do it once in a string than every time an item is printed.

To continue the example of the budget program, the choice of array was dictated by:

1. The need to display several lines relatively quickly.
2. No need to change the files once they were in place.
3. Numeric values needed to be right-justified.

I therefore chose to store the entire file in a single string array variable T$, with each element (line) being 32-characters long. But if the bulk of the file you want to establish consists of numbers and they require continual re-definition, then, scheme A would probably be more appropriate.

2. File Dimension

The other set of options to face in choosing an array format is to set the number of dimensions of the array and its size. If the information structure has been worked out at this point the choice of how many dimensions you want the array to have should be quite simple. A one-dimensional array (like a single column of items) can be used for a single string of numbers or, as in my example, a single alphanumeric column of 32-character lines. A two-dimensional array (like a matrix of rows and columns) can store numbers in a row-column format. Using this information along with the chapter in the ZX manual on arrays, you should be able to define an array to hold your files.

The main thing to note about setting the file SIZE is that it is critical to DIMension the array (file) to the maximum forseeable size that will be required. This is akin to filling a file folder with enough blank sheets of paper to hold all of the information that you will want to write into the file. If the array turns out to be too small to hold all of the information you later want to store in it, there is no recourse but to re-DIMension the array (file) larger, and wipe out all of the information that you have already stored there.

Conclusion

The storage of file information on a ZX-81 can be very useful if the information is easily accessible and simple to INPUT. And it's an excellent way to experiment with variable assignments and learn to manipulate arrays on the ZX-81.

(Editor's Note: We invite comments and further articles on the subject of file creation and manipulation from our readers.)

REVIEW

By: B. Johnson

Memotech Centronics Parallel Interface and the Seibosha GP 100A Printer.
$339.00 + $4.95 plus shipping and handling from:

E. Arthur Brown Co., 1702 Oak Knoll Drive, Alexandria, MN 56308.

Six months ago, after a two month wait due (ostensibly) to delays in shipments of printers arriving from overseas, the dot-matrix printer and parallel interface I had ordered form Memotech arrived on my desk at work. Opening the box (I didn't wait until I got home) I found the type of professional - looking products that I expected from Memotech: the Centronics-type parallel interface, in a black aluminum case that fits between the computer and my 64K RAM pack (also Memotech), and the dot-matrix printer, a simple but dependable-looking import from our Japanese friends. Hook-up of the components (when I got home) to the ZX-81 was simple. As long as you can locate the right plugs, the assembly of RAM pack-to-interface-to-computer and interface-to-printer is easy. But now it becomes necessary to open the user manual, which is very tiny and contains a bewildering assortment of information. A quick perusal of the manual reveals that approximately half of it is devoted to an assortment of information unusable by four-fifths of its end users plus a few Memotech ads. Not much left for the actual software instructions that will drive the printer. So the instructions must be few and simple, right? Wrong. There are actually no different commands required other than the same LPRINT, LLIST and COPY commands that send information to the ZX-81 printer, but a full-size dot matrix printer (as opposed to either of the ZX/TIMEX printers) requires more instructions, called "control codes," and lack of thorough documentation and a sufficient number of examples at this point in the manual leave the user to much frustrating experimentation in trying to get his control codes right.

Continued on PAGE 25

"TECHNICAL TIPS FOR THE TIMEX"
By: Tracy Norris

This column is devoted entirely to hardware repair and modifications to the Timex series of personal computers. In this feature I will show you on a monthly basis how to repair, modify, expand, and in general enjoy the hardware aspects of your personal Timex computer. In case you have any doubts as to whether I know what I'm talking about let me tell you a little about MY Timex...

I have a full 6.5 Megabytes of storage available to me on 3-8" floppy disk drives, of which 2 are running DSDD (Double Sided-Double Density). The above is of my own design which will be available to the Timex user in December. The retail cost will be under $200 for Drive #1 and under $110 for Drives 2 & 3. My Timex has 7 controller boards for controlling lights, hardware, coffee pot, etc. I have 128KBytes of usable RAM, of which 64K can be used for program lines and the other 64K is used for variables etc. My little venture is worth about $5,400 at the present time. This is not to be considered "bragging". I am just letting you know that much of what your friends say can't be done with the "itty-bitty computer" I have already accomplished. Enough with what my computer can do. Let's get on with making yours do more! This month's project is really something special. Do you remember when your fellow computerist said that your computer was inferior compared to his? Maybe it is now, but it won't be after a couple of issues of HORIZONS and a few hours per month reading my articles. I have designed a low-cost repeat key module that will work with either the Timex TS-1000 or the SINCLAIR ZX-81 (the same thing but with different packaging). 95% of all larger computers have repeating keys as standard equipment, but the Timex computer does not. So we will now proceed to upgrade our "little" computer...

NOTE!: T-S Horizons, Norris Radio & Electronics, T-Tech Industries LTD, their affiliates, or employees can assume no responsibility for damages arising out of the use/misuse of these articles. The reader must understand that any implementation of these projects is to be taken at the reader's own risk.

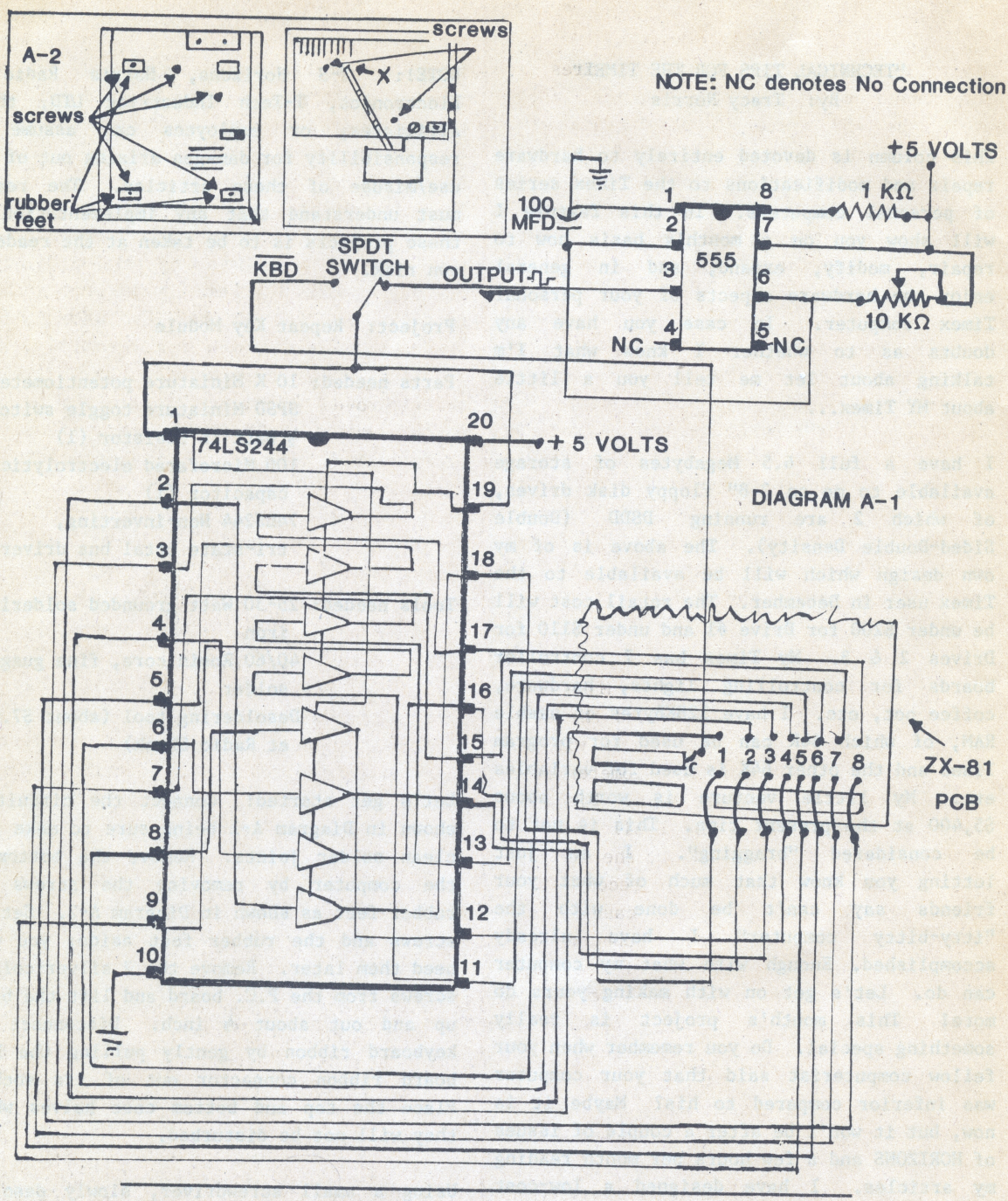
Project: Repeat Key Module

Parts needed: 10 K Miniature potentiometer(1)
SPSD Miniature toggle switch(1)
½ Watt 1K resistor (1)
100 Microfarad electrolytic capacitor (1)
74LS244 Non-inverting, tri-state octal bus driver(1)

Tools needed: 25-30 Watt grounded soldering iron
40/60 Rosin core, fine guage solder
Desoldering tool (about $7.00 at Radio Shack)

Let's get started! Connect the circuit as shown in Diagram A-1 being sure to make good clean solder joints. Remove the bottom of the computer by removing the screws and rubber feet as shown in Diagram A-2. Set the screws and the rubber feet aside; you will need them later. Remove the 2 silver-colored screws from the P.C. board and lift the board up and out about ½ inch. Disconnect the keyboard ribbon by gently pulling the keyboard ribbon connector out of its socket. Place the top and bottom case halves where they will not be disturbed.

Using a small screwdriver, slowly desolder and pry out the eight 1N418 diodes from the PCB and lay them aside. Using the diagram for a guide, connect the wires from the 74LS244 bus driver to the holes shown in the diagram that were formerly occupied by the diodes. Using a volt-ohmmeter, find a +5 volt source on the ZX-81 or TS-1000 PCB.



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Having located it connect all +5V wires from the repeat module to that source. (Note: Avoid the +5V trace to the modulator or severe TV interference will result). Refer to Diagram A-2 and find the "X" that is in the picture. It has an arrow pointing to the solder pad at the end of the little metal strip. Connect the 2 grounded pins to this point.

Now for the test...plug in the computer and place a wire jumper between a metal contact on the small female keyboard connector (any one will do) and a metal contact on the large female connector. A character should appear and begin to repeat itself. If it doesn't, turn the 10KΩ potentiometer to different settings. If it still doesn't, check all connections and check all solder joints. (Note: Make sure the switch is in the "REPEAT" mode.)

Locate an area on the uppercase half and mount the select switch. (Note: Make doubly sure that there is nothing behind the switch on the PCB that will interfere with the switch casing.) See the potentiometer at the repeat rate that suits you best. Disconnect the wire jumper. Using the 2 silver-colored screws, mount the PCB back in the uppercase half. (Did you remember to reconnect the keyboard?) Replace the bottom case half and reinstall the 5V screws and 3 rubberfeet. I hope that you enjoy the use of the repeat key. (Suggestion: If you need to type in a long REM statement, place a book on the space key and the rest is automatic.)

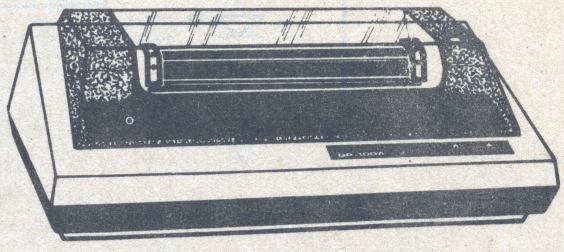
For those of you who are scared by the looks of a soldering iron, I will build and install the repeat module for $30.00. Also, for those of you users who have the above phobia and a subscription to TS-HORIZONS knock $5.00 off the above price, ($25.00!). If you just want the module and feel adventurous enough to install it yourself send $19.00. Well, until we solder again next month...

HAPPY COMPUTING!

T. Norris
144 Terry Drive
Slidell, LA 71458

If you can work out the control code bugs and finally get the printer to do what you want, it has several very useful features to allow you to dress-up your output. It has a double-width, bold print as well as its "normal" 10 characters per inch, and it will also "overprint" a word or words (make several printing passes) to make them stand out darker than the rest of the copy. These features, and the 80 character output width you have to work with (as opposed to the Sinclair's 32 characters), give you a much-improved capability to make the printed output from your ZX/TIMEX look professional and readable. The control code problems are manageable, and keep in mind that once you have formatted your output, you need never (well, seldom) fool with it again. And as a program-development tool the Memotech interface/Seikosha printer performs well, cranking out wide, readable listings of programs at a faster rate than the ZX/TIMEX printers. A problem though. Nowhere in the manual is it mentioned that if you attempt to LLIST lines that contain some of the computers' graphic symbols, the interface causes NEW to be executed, wiping out any program material you have in RAM.

Aside from the glitches that I've mentioned here (some of which may have been corrected by now) the printer and interface have turned out to be very dependable and have needed no repairs. They have turned out good copy on 8½" x 11" fanfold paper for over six months now, and show no signs of wear. If you're willing to spend the time required, it will be a welcome addition to your ZX periphenals.



Memotech Centronics Parallel Interface and the Seibosha GP 100A Printer.

BUILD AN UNINTERRUPTIBLE POWER SUPPLY
or
HOW TO GET RID OF THE "PROGRAM BLITZER"

By: C. W. Johnson

You've been sitting, intently watching the monitor as you key in the last few lines of a program that has been plagued with bugs. You just know it will run this time. After all, you have been sitting here for hours and you've only run it about a hundred times. Without a doubt it will run this time as you key in the last entry, when for some unknown reason the screen goes blank. You have just experienced the "Program Blitzer". It completely erases the program.

Has this ever happened to you? If so, then this U.P.S. device may be the thing to keep your sanity while programming on the Sinclair ZX-81.

This uninterruptible power supply design utilizes a Ni Cad battery which serves two purposes 1) A line filter 2) A Power source. As a line filter the battery will filter out any noise on the D.C. line input to the computer. As a power source if the wall plug or the power jack or both are moved, the battery continues to supply power to the computer without interruption.

There are three indicating LES's on the console. (Ref. to Fig. 1). LED #1, which is green, lights up as long as there is a D.C. source from the 9v adapter. LED #2, the yellow one, is used to indicate charging of the 9v Ni Cad battery. The last LED #3, red, indicates D.C. supply voltage from the U.P.S.

During normal operation you have the following conditions. A) L1 is on, B) L2 is off, C) S1 is in #1 position, D) L3 is on. The input D.C. voltage energizes L1, goes through position #1 of S1, through the blocking diode D1, energizes L3 then to the computer. BT1 (battery) is in the circuit via position #1 of S1-B, acting as a filter and an uninterruptible power source.

"PROGRAM BLITZER" EXTERMINATOR

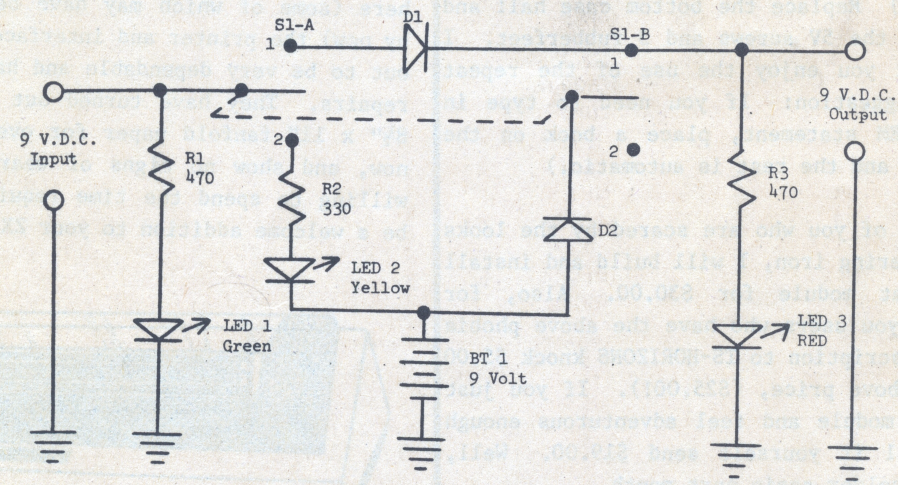


Fig. 1

Move S1 to position #2 with the wall transformer plugged in and it now is a battery charger for BT1. The D.C. source energizes L1, then through position #2 of S1-A feeds through L2 and charges BT1.

CAUTION NOTE: Do not use a regular 9v battery in place of the Ni Cad battery. All parts may be purchased at your local Radio Shack store. Happy "Program Blitzer" extermination.

TYPE OF OPERATION	G	Y	R
NORMAL OP	ON	OFF	ON
CHARGING	ON	ON	OFF
BATTER OP ONLY	OFF	OFF	ON

2 - Silicon Diodes 300 P.I.V.
1 - DPDT Switch
2 - 47052 ¼ Watt Registers
1 - 22052 ¼ Watt Register
3 - Light Emitting Diodes (1-Red, 1-Yellow, 1-Green)
1 - 9 Volt Ni Cad Battery
1 - 9 Volt Battery Plug

CONSTRUCTION

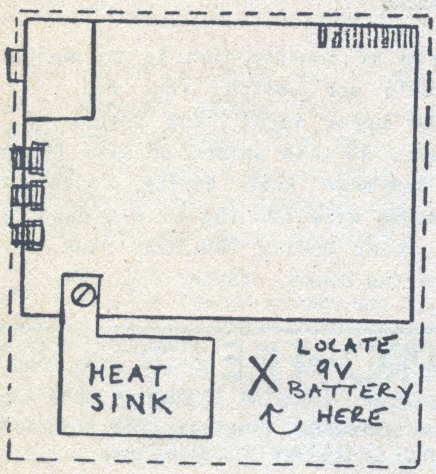
First step of construction is to mount the three LED's and switch. (See Fig. #4) I chose the upper right hand corner of the upper case, as this seemed to give the most room. Remember that during construction leave enough wire for the Ni Cad battery, as it will mount beside the heat sink in the middle of the board. (Refer Fig. #2)

The LED's can be mounted securely, by placing a drop of epoxy on each led as it is installed. Using, a very sharp knife, cut out an opening for the switches. LED's and switch will be used to mount the rest of the components on.

As the components are mounted be sure to use heat sinks while soldering, to D1 and D2. Again using the sharp knife cut the foil on the circuit board at the power in jack. (Refer Fig. #3) Interrupt the electrical data from the tip connection, this is where power in and power out of the blitzer connect. Be sure to scrape the foil clean so as to have good soldor connections.

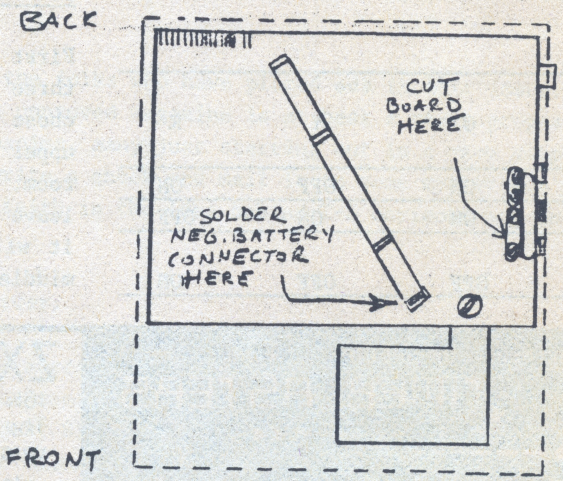
Make sure that the ground connection of the U.P.S. is soldored to bottom case strap. (Refer Fig. #3).

NOTE: Before use be sure to charge the Ni Cad for about 12-14 hours. Fig. #4 Shows final component layout



TOP VIEW

FIG. 2



BOTTOM VIEW

FIG. 3

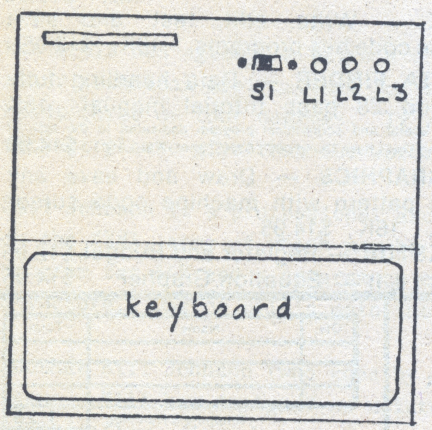


FIG. 4

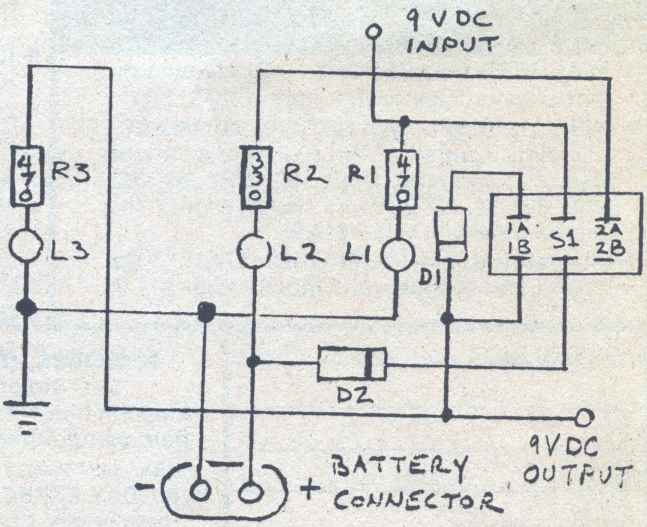


FIG. 5

P.S.
A few parting comments:

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- I know I've said this a lot but don't miss our December issue. Tracy Norris's disk drive is available exclusively through T-S Horizons.

- We welcome contributions (articles, not money) from any experienced, knowledgeable Sinclair users. You don't have to be a good writer, either. (That's what editors are for.)

- Most of all, if you like us - SUBSCRIBE. The first few issues of T-S Horizons will be distributed largely for free and on a somewhat random basis, so the only way to be sure you can get each issue is to subscribe.

Thank you,
Rick Duncan, Publisher

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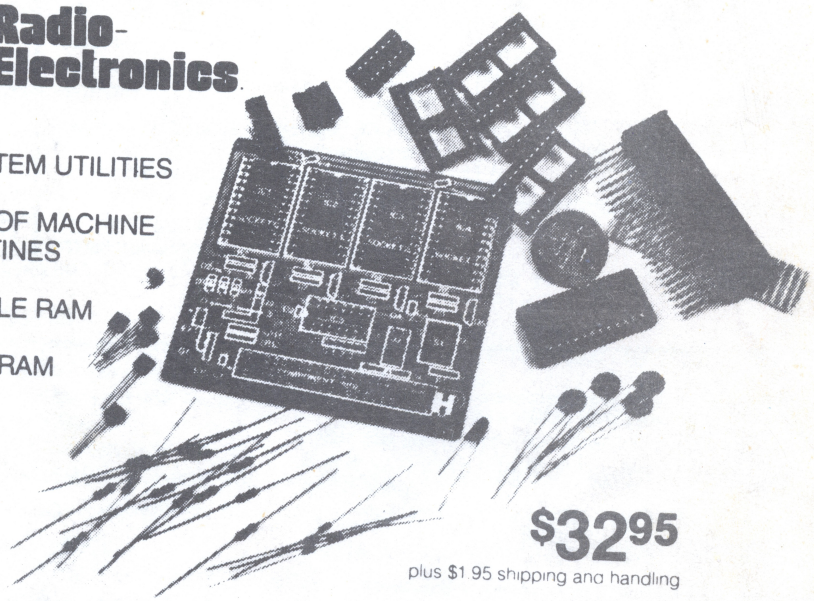

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(S.U.N. Newsletter Nov/Dec 82)

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(SYNC Magazine Mar/Apr 83)

Provides the user with instant software...an extremely versatile memory extension...

(Z-WEST June 83)

INTRODUCTION

This memory board is designed to fill the transparent 8K block of memory (from 8K to 16K) in a ZX81-16K system. This area of memory is an ideal place to store, either permanently or temporarily, machine language routines or data which are to be used by the BASIC system.

Sample utilities are included with the kit.

The use of HM6116LP 2K CMOS RAM memory IC's with their own reserve power supply means that routines stored in the RAM are nonvolatile -- the RAM retains its memory even when the ZX81 is switched off or reset. Moreover, being RAM, the routines you store in the memory are easily modified. The lithium cell supplied with the board will maintain sufficient reserve power for almost ten years.

ASSEMBLY

Complete step-by-step instructions in a 20 page manual make assembly of the board easy. The kit (pictured above) is complete with a silkscreened solder-masked printed circuit board, all capacitors, resistors, transistors, sockets, connectors, integrated circuits, and the lithium cell. The board is supplied with one 2K CMOS 6116LP-3 RAM -- it will accomodate three more for a total of 8K.

Complete kit with one 2K 6116LP-3	$32.95
Additional three 6116LP-3	$18.00
Bare pc board & manual	$13.05
Kit for EPROM use only	$22.95
Assembled & tested with 2K	$47.95
Assembled & tested with 8K	$65.95
Shipping & handling per order	$ 1.95

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